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Science Advisory Report 2014/024

ECOLOGICALLY AND BIOLOGICALLY SIGNIFICANT AREAS (EBSA) IN NORTHERN FOXE BASIN, NUNAVUT

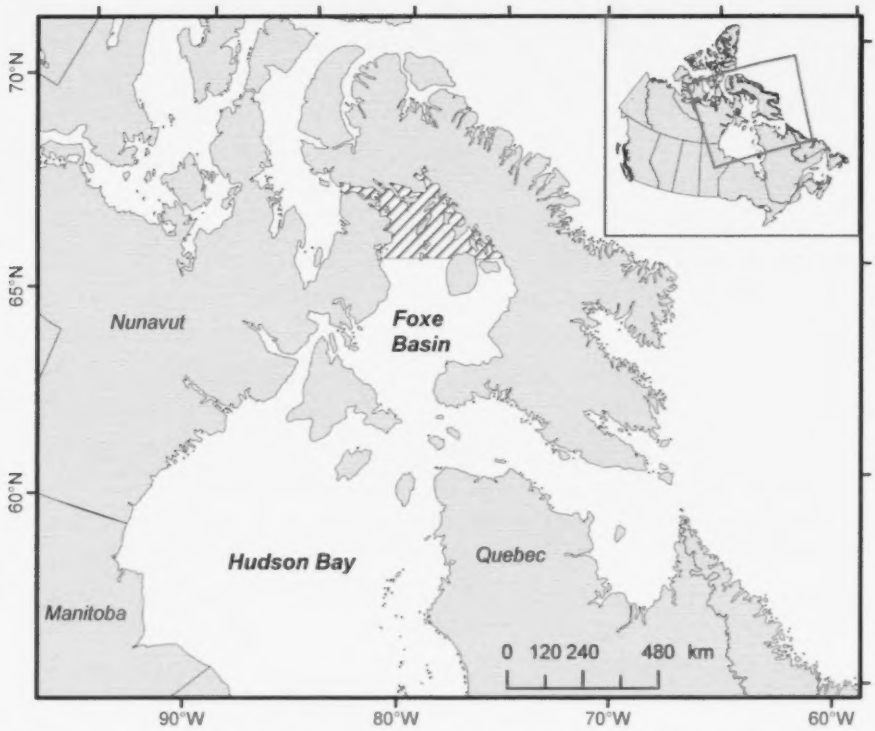

Figure 1. Northern Foxe Basin study area (red diagonal lines) with southern boundary line set at 68°N.

Context:

During an arctic marine workshop held in 1994, Foxe Basin was identified as one of nine biological hotspots in the Canadian Arctic. In fall 2008 and winter 2009, the Oceans Program in Fisheries and Oceans Canada (DFO) Central and Arctic Region conducted meetings in Nunavut with the Regional Inuit Associations, Nunavut Tunngavik Inc., Nunavut Wildlife Management Board and Government of Nunavut to consider areas in Nunavut that might be considered for Marine Protected Area designation. The northern Foxe Basin study area, which includes Fury and Hecla Strait, was selected as one possible area (Figure 1). Based on a request for advice from Oceans Program, a science advisory meeting was held in June 2009 to assess the available scientific knowledge, and consider published local/traditional knowledge, to determine whether one or more locations or areas within the northern Foxe Basin study area would qualify as an Ecologically and Biologically Significant Area (EBSA). Two community meetings were subsequently held to incorporate local/traditional knowledge.

This Science Advisory Report is from the June 29, 2009 (Winnipeg, MB), September 10, 2009 (Igloolik, NU) and November 19, 2009 (Hall Beach, NU) meetings for the Ecologically and Biologically Significant Areas selection process for northern Foxe Basin. Additional publications from this meeting will be posted on the DFO Science Advisory Schedule as they become available.

Canada

SUMMARY

- Three EBSAs were identified and delineated in the northern Foxe Basin study area based on the best available biological and ecological information available at the advisory meeting and local knowledge from meetings held in Igloolik and Hall Beach.
- The Rowley Island EBSA has high productivity at or near the sea ice edge, important habitat for Atlantic Walrus (*Odobenus rosmarus rosmarus*) and Bowhead Whale (*Balaena mysticetus*), and serves as a migratory corridor for several species of marine mammals.
- The Igloolik Island EBSA contains a polynya(s) that supports a number of species including Bowhead Whale and Polar Bear (*Ursus maritimus*) during critical periods in their life history; and serves as a migratory corridor for several species of marine mammals.
- The topography and physical conditions through the Fury and Hecla Strait EBSA creates the conditions for biologically and ecologically important habitat in the other two identified EBSAs. It also has Polar Bear denning sites along the north coast and serves as a migratory corridor for several species of marine mammals.
- All three EBSAs provide feeding and/or staging areas for marine birds.
- On the basis of the two community meetings, the northern boundary of the Rowley Island EBSA was extended to incorporate important habitat for Walruses and the southern boundary was extended to incorporate important habitat for Walruses and marine birds.
- Since the limits of the Rowley Island EBSA and Igloolik Island EBSA are based on the seasonal and complex nature of ice extent and the formation (polynyas and ice edges), their boundaries are somewhat variable. Thus the outlines of these EBSAs, as presented in this document, should be considered an approximation and the precautionary approach should be used in the management of activities in areas within or adjacent to these EBSA.
- As new information becomes available and/or effects of human activities like climate change or resource development occur, the boundaries of the three EBSAs and the potential for additional EBSAs in the study area should be re-evaluated.

INTRODUCTION

Canada's *Oceans Act* (1996) authorizes Fisheries and Oceans Canada (DFO) to provide enhanced management to areas of the oceans and coasts which are ecologically and biologically significant (DFO 2004). The identification of an EBSA is considered a useful tool to call attention to areas that have particular ecological or biological significance, in order to facilitate a greater-than-usual degree of risk aversion in the management of activities (DFO 2004).

To that end, DFO Oceans Program asked DFO Science to evaluate the northern Foxe Basin study area (Figure 1) to determine whether one or more locations/areas within it would qualify as an EBSA. Published and unpublished scientific knowledge on oceanographic processes, primary and secondary production, benthic invertebrates, macrophytes, anadromous and marine fishes and marine mammals was used during a science advisory meeting to evaluate EBSAs in northern Foxe Basin. Marine birds and Polar Bears were also considered, although the primary focus was aquatic marine ecosystems for which DFO has responsibility. The meeting participants also considered published traditional/local knowledge. The technical information evaluated during the meeting is presented in Paulic et al. 2014.

Meetings were subsequently held in the communities of Igloolik (NU) and Hall Beach (NU) during which the science advice was presented to and discussed by local knowledge holders, and they contributed their knowledge to the process. A summary of the discussions for all three meetings is presented in DFO (2010).

The scientific and traditional/local knowledge were later integrated and are presented in this document. (See Paulic et al. 2014 for the full technical details, maps and references for information summarized in this report.) The EBSA map and associated information will aid management sectors in the future with the mitigation of risks and threats to each of the areas. It will also aid decision-makers during assessment processes and help to identify research and/or knowledge gaps.

ASSESSMENT

Geology and bathymetry

Northern Foxe Basin is a shallow oceanic basin located in Canada's eastern Arctic between Baffin Island, the Melville Peninsula and Southampton Island, Nunavut (Figure 2). The basin is connected to the Arctic via the Gulf of Boothia and Fury and Hecla Strait and connects to the Labrador Sea via Foxe Channel and Hudson Strait. Generally, this area is less than 100 m in depth with several small depressions that reach approximately 300-350 m.

Limited geophysical information is available for northern Foxe Basin. The area is mostly bedrock with some gravel outcroppings near Igloolik and southwest towards the community of Hall Beach.

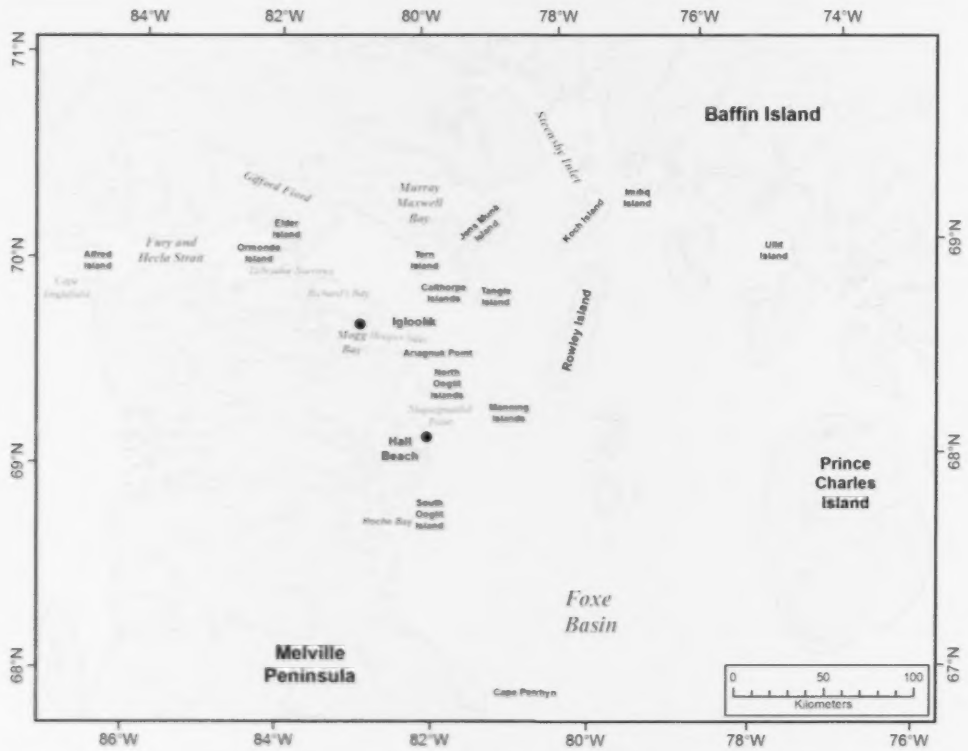

Figure 2. Map showing place names in northern Foxe Basin mentioned in the text.

Ice and hydrological processes

There is limited available oceanographic information available for this region. The data tends to be spatially and temporally sparse and most is from the mid-1980s. However, there is a general understanding of the circulation patterns, sea ice trends and the formation of polynyas in the area.

Circulation

Some of the Arctic surface waters that enter the Atlantic Ocean travel via surface currents from the Canadian Archipelago through Foxe Basin. They flow eastward through Fury and Hecla Strait where there is intense tidal mixing, resulting in vertically homogeneous Arctic waters entering Foxe Basin. Surface currents continue to transport Arctic waters along the eastern coast of Melville Peninsula through western Foxe Basin into Foxe Channel. Once it reaches the most southern part of the basin, some of these waters enter Hudson Bay and join a cyclonic circulation around the bay before exiting and re-joining the other portion of Arctic waters from Foxe Basin to form the surface flow in Hudson Strait.

Circulation is generally strongest on the western side of Foxe Basin and reaches a maximum at depth during winter and spring (5-10 cm s^{-1}). Currents play an important role in sea ice movement and the transport of nutrients in northern Foxe Basin. The net annual transport into northern Foxe Basin (1.5×10^{12} m^3) is approximately equal to total annual transport into the basin. This has important effects on the oceanography of the region and would influence the distribution of several species which rely on these currents to produce areas of increased productivity.

Sea Ice

Sea ice provides habitat for animals on its upper and lower surfaces, shapes climate and weather and serves as a platform for transportation and resource-harvesting activities. In northern Foxe Basin, sea ice predominates from November to June and is characterized as first-year ice. Average sea ice break-up begins in July and August after which the area is frequented by old ice (second year and multi-year ice) from the Gulf of Boothia (Paulic et al. 2014).

Freeze-up typically begins in mid- to late-October. In recent years, there has been a shift towards earlier spring break-up and later freeze-up.

Ice cover in Foxe Basin is distinguishable from all other Canadian Arctic ice by its dark color and rough topography. This coloration is due to autumn storms and large tides that cause bottom sediments to be stirred into the water column and subsequently frozen in the ice. Tides and storms can also cause ice rafting by continuous breaking of ice. Ridging and rubble fields have a major impact on freshwater budget estimates in Foxe Basin, potentially increasing the estimated freshwater budget contribution by as much as 30%.

Maximum ice thickness in northern Foxe Basin ranges between 175 – 200 cm when the ice is level and not ridged, however, these values can have large interannual variations. Thinning trends, particularly at the floe edge and around the perimeter of polynyas, have been reported.

Polynyas

Openings in the sea ice, in the form of cracks, leads and polynyas, typically begin to form in northern Foxe Basin in winter. Polynyas are persistent areas of open water and/or thin ice that occur within regions of consolidated ice. They are known to reoccur at predictable locations. In northern Foxe Basin, three large polynyas have been identified; one located around Igloolik

Island (southeast of the eastern end of Fury and Hecla Strait), one north and northwest of Prince Charles Island and another south of Hall Beach (Figure 3).

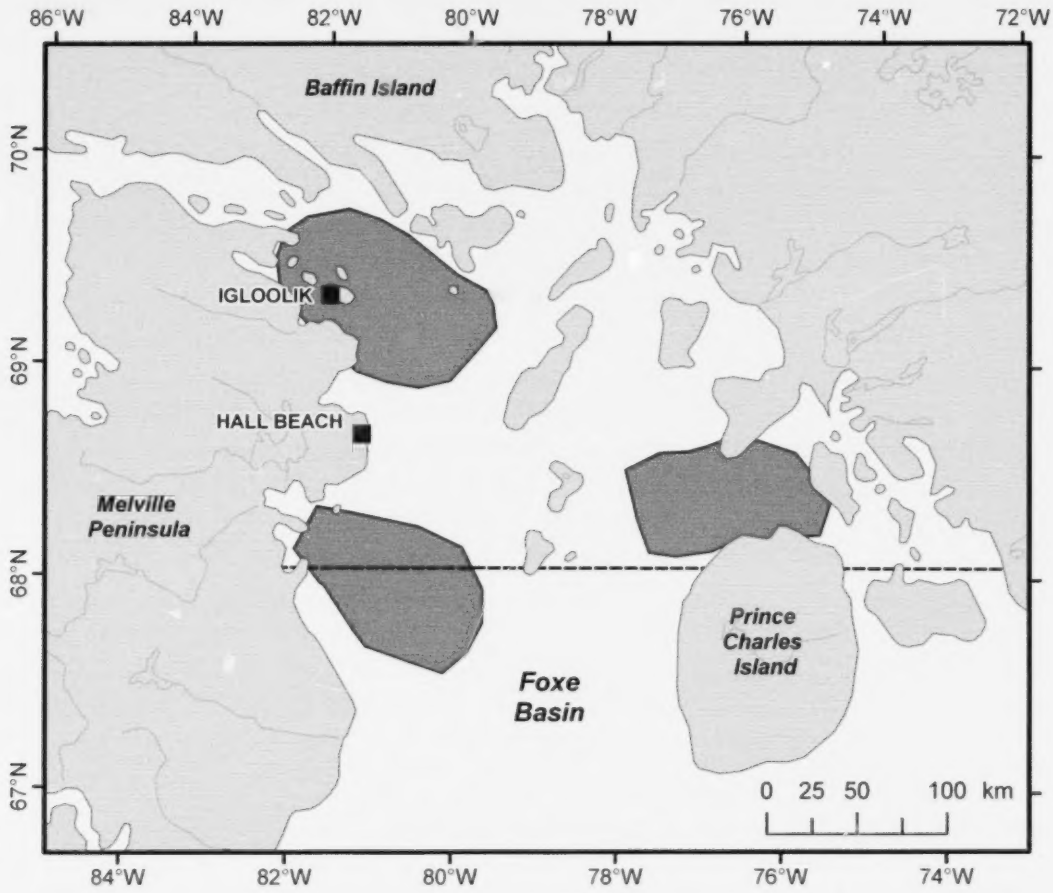

Figure 3. Three main polynyas identified in northern Foxe Basin adapted from Mallory and Fontaine (2004) and Barber and Massom (2007).

The polynya that forms at the eastern mouth of Fury and Hecla Strait typically begins to appear in April or May. Evidence suggests that the ice melts and the polynya forms due to tidal events which bring warm water to the surface and currents that bring water eastward through Fury and Hecla Strait. Since opening of the polynya is largely dependent on current speeds, volume and bottom topography, its location varies annually. There has been an observed decrease in the presence of multi-year ice in northern Foxe Basin in recent years probably because less ice is now pushed through Labrador Narrows into eastern Fury and Hecla Strait as a result of a significant decrease in wind speed and variability in prevailing winds. The floe edge is now closer to the community of Igloolik than previously.

The other polynyas in northern Foxe Basin typically form behind islands. They are kept open by the export of ice and are maintained by air temperature and winds. The polynya south of Hall Beach is thought to be continuously open during winter.

Primary and secondary production

Very little information is available on the export of multi-year ice and ice melt rates in northern Foxe Basin. Limited sampling of primary productivity indicated that nutrients are limiting and concentrations slightly lower in northern Foxe Basin than in Hudson Strait. Salinity was typically lower at the ice-edge in Foxe Basin than in the open water areas, likely due to the melting of landfast ice, which suggests the ice edge is an important area for increased primary production.

Limited sampling of zooplankton in northern Foxe Basin indicated that maximum concentrations occur in July and August with peak concentrations in early September. *Pseudocalanus spp* copepods dominated the zooplankton community. Oceanographic features and currents are often important in determining zooplankton distributions and abundance. In the Igloolik area, the steady influx of ice and water via Fury and Hecla Strait, as well as bottom topography, may create areas of retention. Copepods are thought to be the major food source for Bowhead Whales in the western Arctic and in Isabella Bay in Davis Strait; their importance in northern Foxe Basin is unknown. The stomach contents of a subadult female Bowhead Whale harvested near Igloolik in mid-September 1994 was found to contain a variety of epibenthic and benthic organisms.

Benthic invertebrates and marine plants

Limited scientific data are available but local people have observed a variety of benthic invertebrates and kelp beds in northern Foxe Basin. Walrus and Bearded Seal (*Erignathus barbatus*) feeding aggregation sites can also serve as a proxy for identifying clam beds and other areas where sea cucumbers, sea urchins and nudibranchs are abundant.

Marine and anadromous fishes

Many fish species including Arctic Char (*Salvelinus alpinus*) have been recorded within (or near) the Foxe Basin area (Table 1). Several species of freshwater salmonids were found in marine waters and were included in the table below. Further scientific research is needed to determine distribution, abundance estimates and specific habitat use of each of these species in the region.

Arctic Char

Arctic Char is a key component of northern aquatic ecosystems and is an important food resource for northerners. This species occurs in the rivers and lakes throughout Nunavut and is common in Foxe Basin. During the open water season, coastal waters in each of the EBSAs are used by anadromous Arctic Char for feeding. Further research is needed to better understand Arctic Char habitat use and migration patterns in the region.

Table 1. Common and scientific names of fishes caught in marine waters in or near the Foxe Basin area.

Family	Common Name	Scientific Name
Osmeridae	Capelin	*Mallotus villosus*
Salmonidae	Arctic Char	*Salvelinus alpinus*
Salmonidae	Lake Trout	*Salvelinus namaycush*
Salmonidae	Arctic Cisco	*Coregonus autumnalis*
Salmonidae	Cisco	*Coregonus artedi*
Salmonidae	Lake Whitefish	*Coregonus clupeaformis*
Salmonidae	Arctic Grayling	*Thymallus arcticus*
Gadidae	Arctic Cod	*Boreogadus saida*
Gadidae	Atlantic Cod	*Gadus morhua*
Gadidae	Polar Cod	*Arctogadus glacialis*
Gadidae	Greenland Cod	*Gadus ogac*
Gasterosteidae	Ninespine Stickleback	*Pungitius pungitius*
Gasterosteidae	Threespine Stickleback	*Gasterosteus aculeatus*
Cottidae	Arctic Staghorn Sculpin	*Gymnocanthus tricuspis*
Cottidae	Twohorn Sculpin	*Icelus bicornis*
Cottidae	Spatulate Sculpin	*Icelus spatula*
Cottidae	Fourhorn Sculpin	*Myoxocephalus quadricornis*
Cottidae	Arctic Sculpin	*Myoxocephalus scorpioides*
Cottidae	Shorthorn Sculpin	*Myoxocephalus scorpius*
Cottidae	Ribbed Sculpin	*Triglops pingelii*
Agonidae	Arctic Alligatorfish	*Ulcina olrikii*
Agonodiae	Atlantic Poacher	*Leptagonus decagonus*
Cyclopteridae	Atlantic Spiny Lumpsucker	*Eumicrotremus spinosus*
Cyclopteridae	Leatherfin Lumpsucker	*Eumicrotermus derjugini*
Cyclopteridae	Lumpfish	*Cyclopterus lumpus*
Liparidae	Gelatinous Seasnail	*Liparis fabricii*
Liparidae	Kelp Snailfish	*Liparis tunicatus*
Liparidae	Variegated Snailfish	*Liparis gibbus*
Zoarcidae	Fish Doctor	*Gymnelus viridis*
Zoarcidae	Saddled Eelpout	*Lycodes mucosus*
Zoarcidae	Checker Eelpout	*Lycodes vahlii*
Stichaeidae	Daubed Shanny	*Leptoclinus maculatus*
Stichaeidae	Fourline Snakeblenny	*Eumesogrammus praecisus*
Stichaeidae	Arctic Shanny	*Stichaeus punctatus*

Marine birds

Although there are no significant aggregations of marine birds in northern Foxe Basin, published scientific and traditional/local studies indicate that coastal habitats and polynyas there provide important feeding and staging areas for several species of seabirds and shorebirds. In winter, recurring polynyas and open leads provide feeding sites for over-wintering birds, mainly Black Guillemot (*Cepphus grylle*). They are also important staging areas for eiders, Arctic Tern (*Sterna paradisaea*), gulls and loons waiting for the snow to melt inland to make their way to their nesting grounds. Several known nesting colonies of Arctic Tern, Black Guillemots and Common Eider (*Somateria mollissima*) occur near the community of Igloolik, Hooper Inlet and the area east of Calthorpe Island. Several small colonies of breeding pairs and nesting gulls occur at both the east and west entrances to the narrow part of Fury and Hecla Strait at Alfred Island, Cape Englefield and the Elder and Ormonde Islands. Roche Bay and Manning Island are known to support several colonies of nesting Arctic Tern and Nugsanarsuk Point is considered

to be an important nesting area for gulls, more specifically, Sabine's Gull (*Xema sabini*). Aggregations of shorebirds have been seen in coastal areas near Prince Charles and nearby islands. Northern Foxe Basin may also be an important moulting location for King Eider (*Somateria spectabilis*).

Marine mammals

Bowhead Whales

The Bowhead Whale is a migratory species whose distribution and migrations in the eastern Canadian Arctic are closely linked to seasonal changes in sea ice. The Eastern Canada-West Greenland Bowhead Whale population is reported to be increasing in size in recent years. Published scientific and traditional knowledge studies document Bowhead Whale use of northern Foxe Basin in spring, summer and fall; winter occurrences appear to be rare. In spring and early summer, northwestern Foxe Basin is known to be a nursery area because it provides shallow waters and ice cover that are suitable for nursing newborns and may create a refuge from predation by Killer Whale (*Orcinus orca*). In spring and fall, northern Foxe Basin serves as a migration corridor between wintering waters in Hudson and Davis straits and summering areas in the Canadian Arctic archipelago. Bowhead Whales may use the coastal areas in northwestern Foxe Basin as far south as Cape Penrhyn during their spring and fall migrations (DFO, unpubl. data).

Killer Whales

There has been a marked increase in Killer Whale sightings in Foxe Basin and Hudson Bay since the mid-1900s which appears to be related to a decrease in summer sea ice in Hudson Strait. Local people also suggest that the growing presence of Killer Whales in northern Foxe Basin is related to the increase in numbers of Bowhead Whales. In recent years Killer Whales have been present in northern Foxe Basin every summer when ice conditions are favourable, especially near Igloolik in an area that generally corresponds to the place where Bowhead Whales spend the most time. The migratory patterns of Killer Whales and Bowhead Whales are also similar. Numerous deaths of Bowhead Whales resulting from Killer Whale attacks have been documented for Foxe Basin.

Beluga

Scientific and traditional/local studies report that Beluga (*Delphinapterus leucas)* are present in north Foxe Basin between Igloolik, Hall Beach, Rowley and Jens Munk islands, and off Steensby Inlet in summer and early fall before freeze-up. Hunters report seeing them search for food and feeding. Belugas are occasionally sighted in northern Foxe Basin between late November and mid-July when they become entrapped by ice and overwinter in polynyas. Fury and Hecla Strait is an important migration corridor for this species.

Narwhal

Narwhal (*Monodon monoceros*) are known to occur in northern Foxe Basin but not in all years. This species occurs infrequently in northern Foxe Basin during winter and spring when animals become entrapped by ice and overwinter in polynyas. In summer and early fall, hunters report observing Narwhals searching for food in the Igloolik area, including Richard's Bay, and moving through Fury and Hecla Strait. The Strait is an important migration corridor for Narwhals.

Walrus

Walruses are widely distributed throughout northern Foxe Basin, particularly in areas where shallow depths and the presence of ice during most of the year offer optimal feeding conditions. From late July-early August to early or mid-October, Walruses typically rest on floating ice or

terrestrial haulout sites. Eight former, current and potential Walrus haulout sites have been identified within northern Foxe Basin: South Ooglit Island, North Ooglit Islands, Manning Islands, Ullit Island, Imiliq Island, Bushnan Rock (southwest tip of Koch Island), Tern Island and northwestern Jens Munk Island.

Bearded Seal

Although only limited information is available, relatively high densities of Bearded Seals are thought to be present in northern Foxe Basin year-round in areas where clam beds and benthic communities exist. As the ice begins to retreat in spring they tend to move inshore to pup and to areas where anadromous fish are moving from freshwater to marine areas and where there is greater availability of molluscs. Bearded Seals have been observed following fish into Gifford Fjord. As ice freeze-up occurs in fall they move farther offshore to open water. Juveniles likely use polynyas and open water throughout the year to the extent possible.

Ringed Seal

Ringed Seal (*Phoca hispida*) typically prefer deeper waters which may account for the relatively lower densities in northern Foxe Basin than for other areas in the Arctic for which there are available data. In northern Foxe Basin, Ringed Seals are reported to be most common along the northwestern coastline, and in Gifford Fjord and Fury and Hecla Strait. These areas contain Arctic Cod (*Boreogadus saida*) for food, and ice conditions in spring that support breeding and pupping. Juveniles likely use polynyas and open water throughout the year to the extent possible.

Harp Seal

Harp Seal (*Phoca groenlandica*) follow the receding pack ice from the east coast of Canada into the archipelago in spring and make the return migration in fall. Some animals migrate through Hudson Strait into Foxe Basin where they are seen most often in summer and fall, primarily between Igloolik and Melville Peninsula

Other species

Polar Bear

Polar Bears are widely distributed in northern Foxe Basin, aggregating along the coast during late summer and denning in Murray Maxwell Bay and in Fury and Hecla Strait. The size of the Foxe Basin Polar Bear population, which includes northern Hudson Bay, was estimated to be about 2,100 bears in the mid-1990s and about 2,600 bears in late summer 2009-2010. During the latter study, high numbers of bears were observed on islands in northern Foxe Basin.

Identification and delineation of EBSAs

The northern Foxe Basin study area covers an area of 54,810 km^2 and includes Fury and Hecla Strait. Three EBSAs were identified and delineated in the study area (Figure 4) based on the best biological and ecological information available at the advisory meeting and local knowledge from meetings held in Igloolik and Hall Beach. They were named according to a relevant geographical feature or place name: Rowley Island, Igloolik Island and Fury and Hecla Strait. The three EBSAs combined represent almost 47% coverage (25,550 km^2) within the study area.

The original boundaries of the Rowley Island EBSA delineated during the science advisory meeting were expanded during the meetings held in the communities of Igloolik and Hall Beach (Figure 4). The northern boundary of this EBSA was moved further north to include Steensby Inlet as it was identified by local people as an important area for Walruses. The southern boundary of the EBSA was moved westward to Melville Peninsula. The community of Igloolik

extended the EBSA as far south as Amitoke Peninsula and a later meeting held in Hall Beach resulted in further expansion of the EBSA to Cape Penrhyn. The areas added to the EBSA by the communities encompass habitat important for marine birds and marine mammals, especially Walruses. The most southern portion of the Rowley Island EBSA lies outside the northern Foxe Basin study area.

The following descriptions indicate the dominant significant features and other important attributes of the three EBSAs.

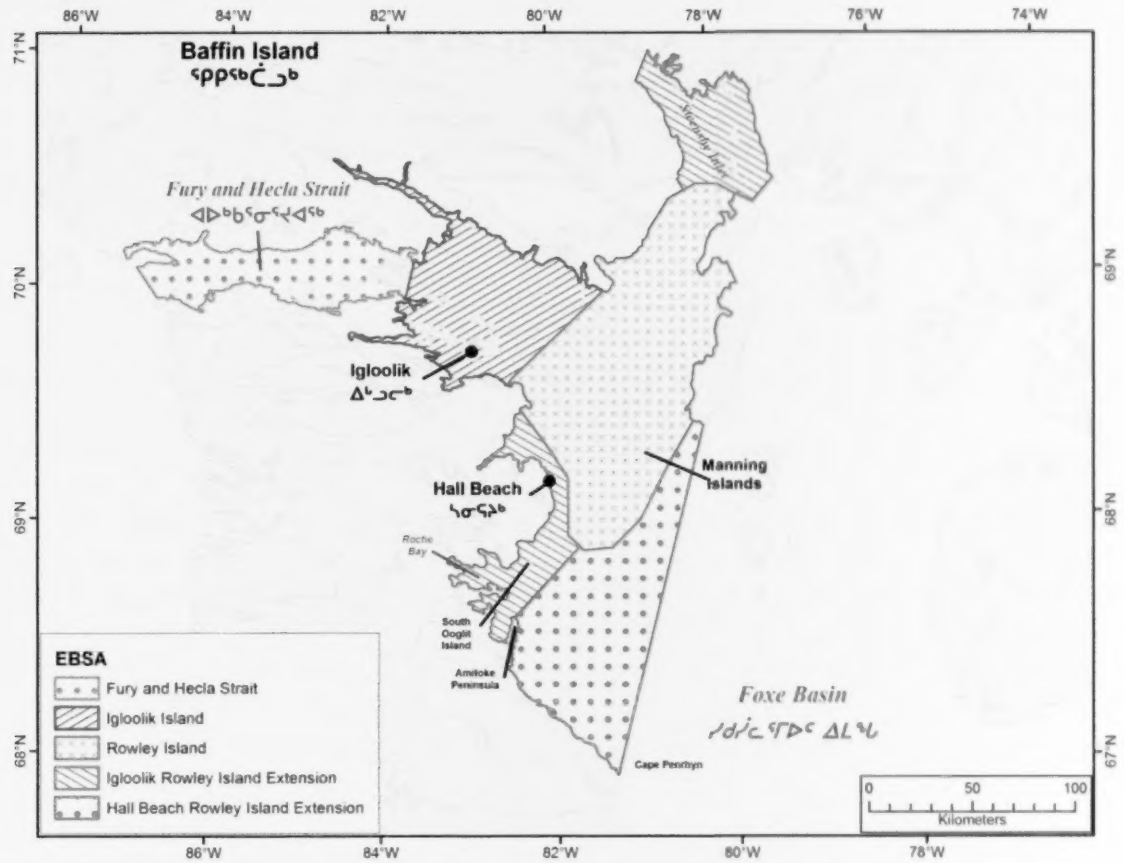

Figure 4. Locations of the three EBSAs in the northern Foxe Basin study area, including the extensions added by the communities of Igloolik and Hall Beach.

Rowley Island EBSA

The Rowley Island EBSA comprises most of Steensby Inlet and the area southwest of there, between Jens Munk, Tangle, Koch, and Rowley islands, to the eastern coast of Melville Peninsula from Arlagnuk Point to Cape Penrhyn (Figure 4) covering an area of about 19,750 km^2, of which about 2,050 km^2 lies outside the northern Foxe Basin study area. High productivity at and near the sea ice edge and important Walrus and Bowhead Whale habitat are the unique features of this EBSA. Marine birds and mammals and Polar Bears frequent this area, particularly from late spring to early fall. This EBSA provides feeding and/or staging areas for nesting Arctic Terns and Sabine's gull. Walruses use sea ice and at least three terrestrial haulouts for birthing, nursing, resting, moulting and access to nearby feeding areas. Polar Bears aggregate at terrestrial haulout sites where Walruses are more vulnerable to predation. Female

Bowhead Whales with calves and juveniles use the EBSA as a nursery area in summer to feed and rest while Killer Whales frequent these waters to prey on them. The EBSA also serves as a migratory route for several species of marine mammals, including Belugas and Narwhals, providing access to feeding areas.

Igloolik Island EBSA

The Igloolik Island EBSA comprises an area that is bounded by Arlagnuk Point on the eastern coast of Melville Peninsula, the southern tip of Jens Munk Island and just east of Ormande and Elder islands at the eastern end of Fury and Hecla Strait (Figure 4), covering an area of about 4,750 km^2. This EBSA includes Gifford Fiord. The unique features of this EBSA are related to the formation of a polynya, in response to currents and tidal events, which supports increased primary and secondary production as well as higher-trophic level species, especially Bowhead Whales and Polar Bears, during critical periods in their life history. Marine birds and mammals and Polar Bears frequent this area. Over-wintering Black Guillemots use polynyas and leads to feed and Arctic Terns, Black Guillemots, Common Eiders and loons stage in this EBSA prior to nesting. Female Bowhead Whales with calves and juveniles use the EBSA as a nursery area in summer to feed and rest while Killer Whales frequent these waters to prey on them. Walruses use sea ice, and possibly two terrestrial haulouts, for birthing, nursing, resting, moulting and access to nearby feeding areas. Polar Bears aggregate at terrestrial haulout sites where Walruses are more vulnerable to predation and use a denning area along the northern coast of the EBSA. This area also serves as a migratory route for several species of marine mammals, including Belugas and Narwhals, providing access to feeding areas.

Fury and Hecla Strait EBSA

The Fury and Hecla Strait EBSA extends from Cape Englefield at the western entrance of the Strait to just east of Ormonde and Elder islands near the eastern entrance of the Strait (Figure 4), covering an area of about 3,100 km^2. The unique features of this EBSA include strong currents, an important migratory route for marine mammals and a Polar Bear denning area. Marine birds and mammals and Polar Bears frequent this area. Fury and Hecla Strait is a relatively narrow body of water about 170 km in length and two km in width at the narrowest point in Labrador Narrows. Depths are greater at the western end of the Strait. Typically strong currents, particularly through Labrador Narrows, move water eastward through the Strait which contributes to the formation of a polynya in the Igloolik Island EBSA. These currents also carry multi-year ice and nutrients from the archipelago into northern Foxe Basin which likely influences the oceanography of the region and the distribution of species which rely on areas of increased productivity. This EBSA provides feeding and/or staging areas for nesting gulls. Polar Bears use a denning area along the northern coast of the EBSA. Fury and Hecla Strait is an important migratory route for several species of marine mammals, including Bowhead Whales, Belugas and Narwhals, providing access to feeding areas.

Sources of Uncertainty

While some species and processes that occur within these EBSAs are relatively well known or understood, others are not, therefore the boundaries of the three EBSAs are imprecise both spatially and temporally. This is particularly true for the Rowley Island and Igloolik Island EBSAs whose spatial limits are based on the seasonal and complex nature of ice extent and the formation of polynyas and ice edges. Thus the outlines of the EBSAs, as presented in this document, should be considered an approximation and the precautionary approach should be used in their application.

Limitations in the availability of data and information may have curtailed the identification of additional ecologically important areas in northern Foxe Basin. Locations of the communities

(i.e., Igloclik and Hall Beach) may have biased the analysis of EBSA in favour of areas located closer to the communities, where the ecology may be better understood. However, it should be acknowledged that communities are more likely to be located in or near areas that support greater wildlife abundance and/or diversity and good hunting opportunities. Changes associated with ongoing climate change (e.g., earlier ice break-up and later freeze-up) and their effects on the ecosystem in northern Foxe Basin may influence where and when ecologically and biologically significant areas occur.

CONCLUSIONS AND ADVICE

Three EBSAs were identified in the northern Foxe Basin study area based on the best available biological and ecological information available at the advisory and two community meetings and through further literature review. The Rowley Island EBSA has high productivity at or near the sea-ice edge, important habitat for Walruses and Bowhead Whales, and serves as a migratory corridor for several species of marine mammals. The Igloolik Island EBSA contains a polynya(s) that supports a number of species including Bowhead Whales and Polar Bears during critical periods in their life history; and serves as a migratory corridor for several species of marine mammals. The Fury and Hecla Strait EBSA has currents that create conditions for biologically and ecologically important habitat in the other two EBSAs. It also has Polar Bear denning sites along the north coast and serves as a migratory corridor for several species of marine mammals. All three EBSAs provide feeding and/or staging areas for marine birds.

The three EBSAs represent almost 47% coverage within the study area. Although the exercise was focussed on the northern Foxe Basin study area, the Rowley Island EBSA was extended beyond the study area into adjacent waters to capture more of the polynya south of Hall Beach, thought to be continuously open during winter, and the ecological importance of that area as identified by local knowledge. As new information becomes available and/or effects of human activities like climate change or resource development occur, the boundaries of the three EBSAs and the potential for additional EBSAs in the study area should be re-evaluated.

SOURCES OF INFORMATION

This Science Advisory Report is from the June 29, 2009 (Winnipeg, MB), September 10, 2009 (Igloolik, NU) and November 19, 2009 (Hall Beach, NU) meetings for the Ecologically and Biologically Significant Areas selection process for northern Foxe Basin. Additional publications from this meeting will be posted on the DFO Science Advisory Schedule as they become available.

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